TEXAS AGRICULTURAL EXPERIMENT STATION

BULLETIN NO. 205 JANUARY, 1917

DIVISION OF ANIMAL HUSBANDRY

Sheep Breeding and Feeding

B. YOUNGBLOOD, DIRECTOR,
COLLEGE STATION, BRAZOS COUNTY, TEXAS.

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BY

J. M. JONES, Animal Husbandman, Breeding Investigations

B. YOUNGBLOOD, DIRECTOR.
COLLEGE STATION, BRAZOS COUNTY, TEXAS

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*As of February 1, 1917.
**In cooperation with United States Department of Agriculture.

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SHEEP BREEDING AND FEEDING.

BY

J. M. JONES, A. M., ANIMAL HUSBANDMAN, BREEDING INVESTIGATIONS.

"Which breed of sheep shall I place upon my farm?" or "Which is the most profitable breed of sheep for Texas farms?" are questions of much concern to the farmers of Texas who are beginning to realize the important rôle that sheep production actually plays in the most successful farm operations. Almost every tract of land in the State, whether large or small, has some land in the form of pasturage which is nat only failing to return any revenue to the farmers, but in a great many instances is a burden on their hands.

The feeding and breeding test reported in this bulletin was conducted for the purpose of securing information that might be of some value to parties interested in the breeding and feeding of sheep in Texas.

OBJECT.

The object of this test was to determine which of the most common mutton breeds of rams when crossed with fine-wooled ewes would produce the most thrifty and desirable lambs grown and fattened under Texas conditions. All items of expense were to be accurately recorded so that it could be determined with what degree of profitableness sheep raising could be conducted.

THE STOCK USED.

Rams.

The several rams used in this test with the exception of the half-blood Karakule-Lincoln were registered and although good individuals they were not high-priced. They were just such registered rams that the ordinary progressive flockmaster would use.

The Rambouillet.

The Rambouillet ram used during this test was purchased from Graham & McCorquodale for $20. He was two years old at the time of the purchase, and was selected from a flock numbering approximately one hundred head of ordinary registered Rambouillet range rams, such as are used on our western ranges. In the selection of the Rambouillet ram, the point uppermost in mind was to secure an individual possessing some scale and a good mutton conformation. This ram weighed

160 pounds in breeding condition and sheared ten and one-half pounds of wool.

The Shropshire.

The Shropshire* ram used in this test was purchased for $30 from Mr. A. D. Turner, Denton, Texas. Although this individual was slightly under size, being a late lamb, he was, nevertheless, a good representative of the breed. This sire was active and of splendid mutton conformation, the body being compact and close to the ground. In prime condition this ram weighed 140 pounds. He proved to be a light shearer, yielding only six and one-half pounds of wool.

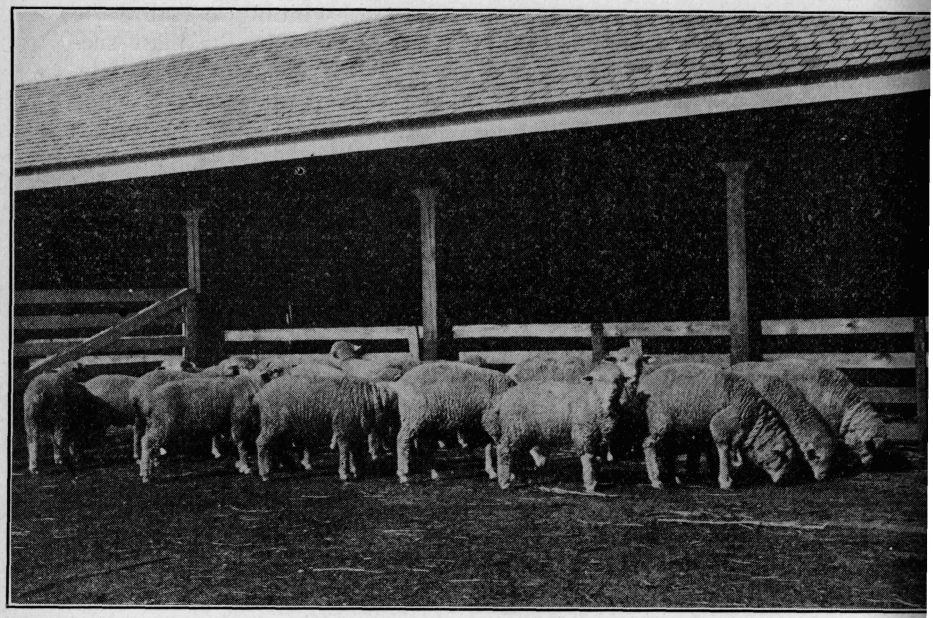

Figure 1.—Rambouillet Lambs After Fattening.

The Hampshire.

The Hampshire ram used in this test was given to the Texas Experiment Station by the late James McClay,† the former superintendent of the live stock farm at the Wyoming Experiment Station. This ram represented some of the best Hampshire blood in the United States, and although less than one year of age at the time of delivery to the Texas Station he showed the strong points of a desirable Hampshire sire.

On account of the Hampshire's lack of development, due to his young age, the fanciers of the Hampshire breed will be inclined to feel that

*The picture of the Shropshire-Rambouillet cross failed to do justice to the pen.
†One of the writer's former teachers in animal husbandry.

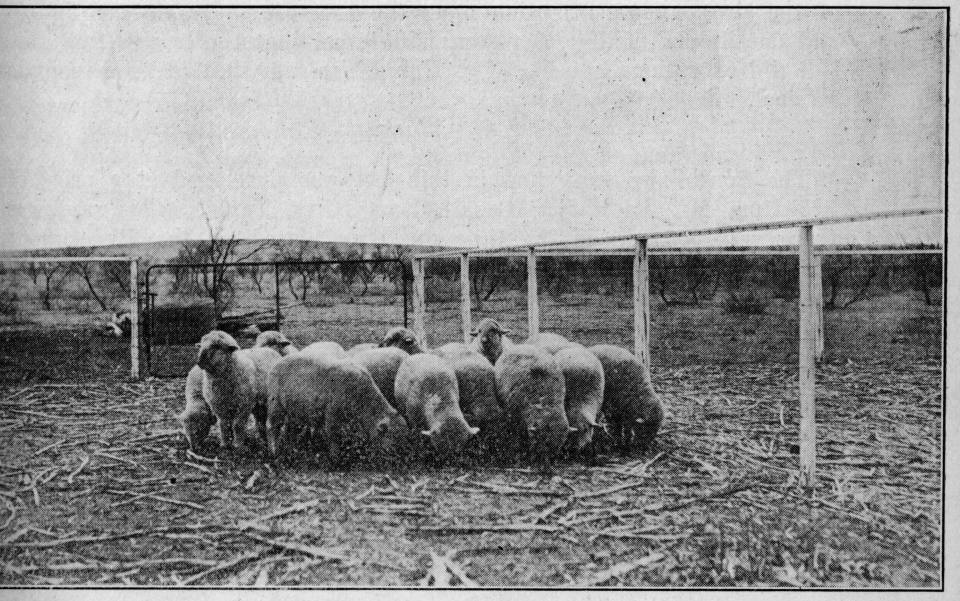

Figure 2.—Hampshire-Rambouillet Lambs After Fattening.

Figure 3.—The Southdown-Rambouillet Lambs After Fattening.

the Hampshire lamb was at a disadvantage as compared with the rest of the sires. Close attention upon the part of readers to the figures and details that follow, however, will reveal that the lambs from this side did exceptionally well. The Hampshire ram sheared seven pounds of wool.

The Southdown.

The Southdown ram used in this test was purchased at a price of $25 from Mr. J. A. Kuykendall, Royse City, Texas. This ram was three years of age at the time of being placed on the Experiment Station farm at Spur. He was of good mutton conformation, although for a Southdown he was a trifle leggy and the body possibly a little light. He was a good individual, however, and the offspring resulting from this cross exhibited strongly the characters of the Southdown

Figure 4.—The Lincoln-Rambouillet Lambs After Fattening.

breed. This Southdown in breeding condition weighed 150 pounds. He sheared six pounds of wool.

The Lincoln.

The Lincoln ram used in this test was presented to the Texas Experiment Station by Mr. Alex Albright, Dundee, Texas. This was a good specimen of Lincoln type, two years of age, but was lambed late and consequently had become stunted. At his best, this Lincoln ram did not weigh over 175 pounds. This ram sheared only eight pounds of wool with an eleven months' growth.

Half-blood Karakule-Lincoln.

The half-blood Karakule-Lincoln ram was purchased from Mr. Alex Albright for $35. At his best this ram weighed 185 pounds. He sheared twelve pounds of wool after his first season at Spur. At the time of the inception of the test herein reported, this ram was two years old. He was a hardy, active individual, of good mutton conformation.

The Ewes.

The Rambouillet ewes used in this test were purchased from the firm of Graham & McCorquodale of Woodson, Throckmorton County, Texas, at a cost of $5.00 per head delivered at the railroad at Albany.

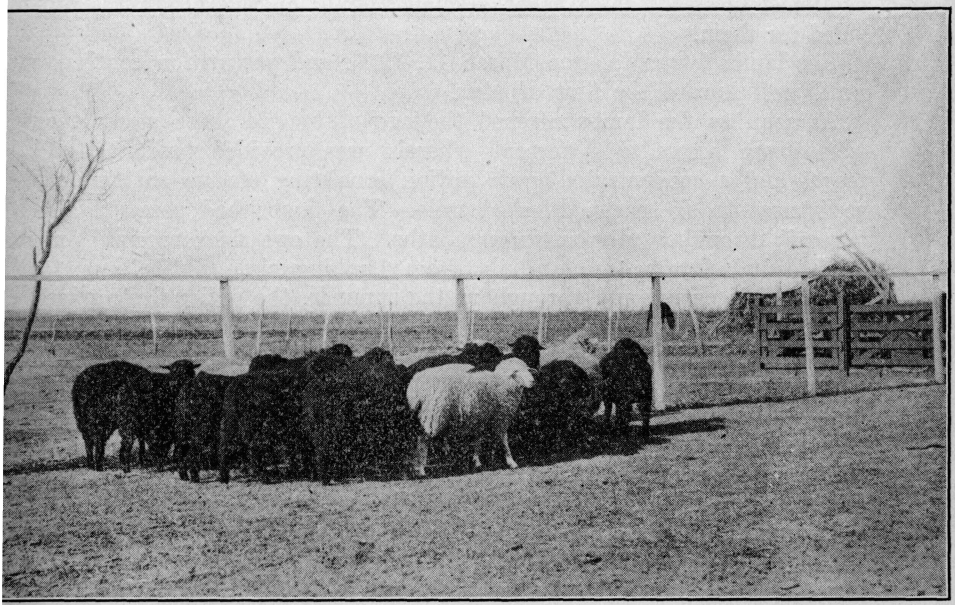

Figure 5.—The Karakule-Rambouillet Lambs After Fattening.

These ewes were large-bodied individuals of uniform type and breeding. Although they were unregistered, Mr. John McCorquodale claimed that the entire flock was eligible to registry. These ewes ranged between the ages of three and five years. They were selected from a flock numbering above 800 head, and accordingly displayed a remarkable degree of uniformity and type.

THE EXPERIMENT.

One hundred and forty-eight good Rambouillet range ewes, of uniform type and breeding, were divided into six lots and bred to registered rams of the different mutton breeds as follows:

Lot 1, Rambouillet; Lot 2, Shropshire; Lot 3, Hampshire; Lot 4,

Southdown; Lot 5, Lincoln, and Lot 6, a half-blood Karakule-Lincoln. The ewes in each lot were marked with a special brand designating to which lot the respective ewes belonged. Kemp's Australian branding fluid was used in marking the ewes.

The breeding season began during the latter part of October, 1914, and the rams instead of remaining with the ewes continually were turned with the respective lots of ewes at night and removed the next morning. The breeding continued for a period of six weeks. During the breeding season the six lots of ewes were grazed upon separate pasture—no additional feed being furnished at this season of the year.

After the breeding season was over, the entire breeding flock was again placed together and carried through the winter, no additional feed being supplied in the fall and winter months except during periods of almost incessant rains, when a small amount of Sudan hay was provided for them.

The lambs began to drop March 17, 1915, and parturition continued until well toward the first of May.

As soon as the lambs reached the age of two to three weeks they were given access to a "creep" wherein was provided tender alfalfa leaves and a concentrated grain ration consisting of one part cottonseed meal to six parts threshed milo. The lambs had access to the "creep" throughout the summer months. The ewe flock received one-half pound threshed milo daily from lambing time until June 15. During this period and throughout the summer, the entire flock grazed the several pastures together, the management of all being identical. The lambs were weaned in September and placed upon an increased grain ration and upon a better pasture. Owing to the shortage of pasture and limited feeding facilities, it was necessary to feed all of the lambs together during the fattening period; hence the data herein presented do not compare the cost of gains made by the several lots.* All of the lambs were numbered individually and were weighed at regular intervals from birth until the termination of the test.

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*At the Iowa Station (Iowa Station Bulletin 35) Curtiss and Wilson conducted a feeding test with lambs with the primary object of determining the relative economy of production and the value of mutton and wool compared—and the adaptation of some of the leading breeds. These investigators reported on the Southdown, Shropshire, Oxford, Suffolk, Lincoln, Cotswold, Dorset, Merino, and a Shropshire and Merino cross. The investigation covered a period of two years the first test extending over a period of ninety days, and the second one hundred and six days. The average cost per pound of gain for the two tests was as follows:

Cotswold, 2.65 cents; Lincolns, 2.88 cents; Rambouillet (one test), 2.91 cents; Leicester, 2.93 cents; Southdown, 3.02 cents; Shropshire, 3.02 cents; Oxford, 3.15 cents, and the Suffolk, 3.16 cents.

At the South Dakota Station (South Dakota Bulletin 127) Wilson conducted a test similar to that herein reported, averaging the results of six tests with a total of 344 lambs. Wilson found that the amount of concentrates required to produce one pound of gain for the respective crosses was as follows:

Cotswold, 5.24 pounds; Oxford, 5.43 pounds; Rambouillet, 5.63 pounds; Southdown, 5.64 pounds; Shropshire, 5.75 pounds, and the Hampshire, 5.87 pounds.

THE MANAGEMENT OF THE BREEDING FLOCK.

The sheep used in this test were taken to Spur, Dickens County, during the latter part of September, 1914, and were grazed upon the native grass pastures, which consisted principally of grama, mesquite and buffalo grasses. As this pasture land had not been heavily grazed earlier in the year and as the growing season had been most favorable, the grass was plentiful. During the fall of 1914 the rainfall in Dickens County was excessive and upon several occasions the flock had to be kept under the sheds and supplied with Sudan hay. These ewes having been raised under range conditions did not take readily to the hay and shelter, but in the course of a few weeks they were more successfully managed in this respect.

During a period of two weeks previous to the inception of the lambing, the ewes due to lamb shortly were separated from the main portion of the flock and supplied with a ration of threshed milo and Sudan hay, one-half pound of the milo and threshed Sudan hay being supplied per head daily. As the season progressed heavy ewes were added to the pen a few days previous to parturition.

During the latter portion of March and all through April the ewes and young lambs were grazed for a few hours daily on a small patch of winter wheat which had been sown between the trees in the Station orchard the preceding fall. The ewes did splendidly on this green forage crop and as a result of the increased milk flow the young lambs made rapid growth during this period.

There was no more green wheat available for grazing after May 1, and accordingly the grazing was again limited to the native grasses. The spring season had been a little backward and in order to keep the ewes in a thrifty condition so as to properly nourish the lambs, a half-pound of threshed milo was supplied daily until June 17, after which time the grain allowance was discontinued.

The lambs were given access to the lamb "creep" throughout the summer and were supplied with one-quarter of a pound per head daily of a mixture of one part of cotton seed meal to six parts of threshed milo. This amount of concentrates was small, but it helped materially in keeping the lambs in a fair growing condition during the long hot summer months.

Salt was liberally supplied to the flock throughout the entire test. A simple and yet novel salt trough was constructed by the writer, the object in mind being to perfect a trough, a portion of which after having been smeared with pine tar would leave some of this liquid on the nose and face of the individual sheep as they came daily to the troughs to lick the salt. The object in mind was to keep the gad-fly away from the nasal cavities of the different members of the flock by means of the repellant odor of the pine tar. The trough above mentioned is of simple construction, yet effective. Briefly, it was nothing more than a trough four inches deep by six inches wide by four feet in length. At a distance of three inches from the bottom of the trough was placed a board

three and one-half inches wide running the entire length of the trough. This left a two and one-half-inch space through which to place the salt, and the same amount of space from which to lick it. A strip of sheep skin with the wool side out was tacked to the edge of this three and one-half-inch piece of board and was smeared with tar every evening just prior to bringing the sheep into the lots. This scheme seemed to be effective as the flock did not appear to suffer from grubs, which develop from the deposition of the small gad-fly eggs at the entrance of the nasal cavities.

THE FATTENING PERIOD.

The lambs were weaned during the early part of September and placed on a field of headed milo stalks. The grain ration was at this time increased to one-third of a pound per head daily, and the lambs began to regain some of the flesh that had been sacrificed during the latter part of the hot summer.

The feeding period proper was begun October 12, 1915, at which time the concentrated ration was increased and more liberal foraging provided for the lambs. The lambs were grazed from October until December 15 on the fields that had produced milo, feterita, and Sudan crops, some splendid foraging being provided on the headed milo and feterita stalks as well as on the Sudan grass and the limited tract of winter wheat that was available. Had the lambs not been managed as above stated practically all of the roughages consumed during these two months would have been partial waste.

The lambs were removed from the fields on December 15 and placed in the dry lot, and in addition to the concentrated ration, received all the roughage in the form of Sudan hay, sorghum fodder and feterita stover that they would consume.

TABLE 1.

Showing Total Feed Consumed by the Lambs From Birth Until Date of Marketing.

Period.	No. of sheep.	Feed Stuffs.	Feed Consumed, Pounds.		*Total cost of feed.	Cost of feed per lamb.
			Daily per lamb.	Total.		
Birth to Oct. 12	120	Cotton seed meal	.....	801.36	$12.02	$0.10
		Threshed milo	.....	4,808.64	36.06	.30
		Alfalfa hay	.....	500.00	5.00	.04
October 13—January 5 (85 days)	120	Cotton seed meal	.234	2,391.50	35.87	.30
		Milo and feterita heads—ground	.90	9,196.00	45.98	.38
		Sudan hay	.35	3,575.00	14.30	.12
		Sorghum fodder and feterita stover	.489	4,990.00	9.98	.08
January 6—January 17 (12 days)	120	Cotton seed meal	.337	485.00	7.27	.06
		Milo and feterita heads—ground	1.422	2,049.00	10.25	.08
		Sudan hay	1.406	2,025.00	8.10	.07
		Sorghum fodder and feterita stover	2.894	4,168.00	8.33	.07
January 18—March 8 (51 days)	36	Cotton seed meal	.072	133.00	2.00	.06
		Milo and feterita heads—ground	1.789	3,285.00	16.43	.46
		Sudan hay	.692	1,272.00	5.09	.14
		Sorghum fodder and feterita stover	.811	1,490.00	2.98	.08
		Alfalfa hay	1.659	3,047.00	30.47	.86

Average cost of feed for 120 lambs from birth to January 17 ..... $1.60

Average cost of feed for 36 show lambs from January 18 to March 8 ..... $1.60

*Cost of Feed:

Cotton seed meal	$30.00 per ton
Threshed milo	15.00 per ton
Milo and feterita heads, ground	10.00 per ton
Sudan hay	8.00 per ton
Sorghum fodder and feterita stover	4.00 per ton
Alfalfa hay	20.00 per ton

Table 1 shows the total feed consumed by the lambs from birth until the time of marketing. The first division of this table shows the total amount of feed consumed by the lambs from birth until October 12 previous to fattening. The second division, from October 13 to January 5, 1916, shows the total feed consumption during that period. Thirty-six show lambs were separated from the main flock January 5, and placed on a different ration, although the total feed consumed by all of the lambs during this period has been figured together, the object in so doing being for the purpose of figuring the total cost of feed per lamb from the time of birth until marketing the main portion of the flock January 20.

The period January 18 to March 8 shows the amount of feed consumed after the first shipment of lambs had gone to market in January. By referring to the final column of Table 1, one will observe that the cost of feed per lamb from birth until January 17, was exactly $1.60 per head. It is also interesting to observe that during the period January 18 to March 8, the cost of feed per lamb amounted to $1.60, or just twice the cost of feeding the lambs from birth until January.

It will be observed by referring to Table 1 that the cost of grain per lamb through the summer months amounted to only 44 cents per head to October 12. Had there been more abundant grazing available it would have been unnecessary to feed any grain prior to the fattening period, but in view of the fact that grazing conditions were not ideal the small allowance of concentrates supplied through the summer was well worth the increased cost incurred.

TABLE 2.

Showing Gains Made by Lambs and the Amount of Feed and Cost per Hundred Pounds of Gain in Live Weight.

Period.	Number of lambs.	Weight of lambs, pounds.	Total gain, pounds.	Average gain per head, pounds.	Gain per head daily, pounds.	*Feed Consumed Per 100 Pounds Gain.					Cost of Feed Per 100 Pounds Gain.					
						Cotton seed meal.	Milo and feterita heads, ground.	Sudan hay.	Sorghum fodder and feterita stover.	Alfalfa hay.	Cotton seed meal.	Milo and feterita heads, ground.	Sudan hay.	Sorghum fodder and feterita stover.	Alfalfa hay.	Total.
Beginning Oct. 13 to January 5.....	120	7,212 10,402	3,190	26.58	.3127	74.9	288.30	112	156	.....	$1.12	$1.44	$0.45	$0.31	.....	$3.32
January 6 to January 17.....	84	7,060 7,532	472	5.62	.468	77.9	332.00	271	559	.....	1.17	1.66	1.08	1.12	.....	5.03
January 6 to March 8.....	36	3,342 4,404	1,062	29.50	.468	23.5	354.50	190	284	287	0.35	1.77	0.76	0.57	$2.87	6.32

*During the first period the lambs were grazed in the field until December 15.

Table 2 shows the daily gains and the amount of feed consumed per hundred pounds gain in live weight by the lambs from time of being placed on feed until their disposal. The lambs had access to a field of milo and Sudan until December 15, which accounts for the small cost of $3.32 per hundred pounds of gain during the period October 13 to January 5. During the period January 6 to January 17, the cost of gain per hundred pounds increased to $5.03. As shown in the final column the cost of gain per hundred pounds for the show lambs increased to $6.32 after the disposal of the main portion of the flock. These lambs made splendid gains, the increased cost of gains being largely due to the high-priced alfalfa hay introduced into the ration late in the feeding period.

TABLE 3.

Summary of Test Showing Birthweight, Gains, Shrinkage, Sales Receipts, and Dressing Percentages.

	Average birth weight.	Average weight at age of four weeks.	Average weight at age of eight weeks.	Average weight at 5½ to 6 months. Oct. 12—put on feed.	Average weight Jan. 5	Gain per lamb Oct. 12 to Jan. 5. (85 days.)	Average daily gain.	Weight 84 lambs Jan. 5. (These lambs shipped Jan. 18.)	Weight 84 lambs Jan. 17, at feed lot.	Gain per lamb Jan. 6 to Jan. 17. (12 days.)	Average daily gain per lamb	Weight 83 lambs at Ft. Worth Jan. 20.	Shrinkage— per cent.	Dressing percentage.	Price received per Cwt.	Price received per lamb.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.				
Straight Rambouillet.	8.4	21.3	36.5	57.0	82.8	25.8	.3035	80.3	85.8	5.5	0.46	78.7	8.28	46.6	$9.90	$7.79
Shropshire-Rambouillet.....	9.2	23.0	38.0	57.1	84.1	27.0	.3176	82.0	85.3	3.3	0.28	76.9	9.85	48.0	9.90	7.61
Hampshire-Rambouillet.....	10.3	23.3	39.2	61.8	91.3	29.5	.3470	86.9	95.0	8.1	0.68	86.7	8.74	47.1	9.90	8.58
Southdown-Rambouillet.....	9.2	23.6	38.8	56.3	80.6	24.3	.2858	78.2	82.7	4.5	0.38	75.0	9.31	47.6	9.90	7.43
Lincoln-Rambouillet.....	9.98	25.0	42.6	72.7	98.4	25.7	.3023	95.4	101.4	6.0	0.50	88.9	12.33	50.0	9.90	8.80
Karakule-Rambouillet.....	8.94	22.8	38.8	59.9	86.4	26.5	.3117	85.5	92.5	7.0	0.58	82.0	11.35	48.5	9.90	8.12

TABLE 4.

Table Showing Gains Made by 36 Lambs Held on Feed for the Fat Stock Show, March, 1916.

	Average weight 36 show lambs Jan. 5. Pounds.	Average weight 36 show lambs Feb. 15. Pounds.	Average weight 36 show lambs Mar. 8. Pounds.	Average gain per lamb Jan. 5 to Mar. 8 (63 days) Pounds.	Average daily gain per lamb Jan. 5 to Mar. 8. Pounds.	Average weight of 36 show lambs Ft. Worth Mar. 18. Pounds.	Shrinkage per cent.	Dressing percentage	Price received per Cwt.	Price received per lamb.	Profit received for show lambs over first shipment.
Straight Rambouillet.....	89.3	102.3	115.0	25.7	.4079	103.4	10.00	49.1	10.00	10.34	$2.54
Shropshire-Rambouillet....	88.6	102.0	112.3	23.7	.3762	108.3	3.56	46.6	10.00	10.83	3.22
Hampshire-Rambouillet....	100.0	117.6	134.3	34.3	.5444	126.6	5.73	48.0	10.75	13.60	5.02
Southdown-Rambouillet....	86.3	102.0	114.0	27.7	.4397	111.6	2.10	49.6	10.50	11.71	4.28
Lincoln-Rambouillet.....	103.0	120.8	135.6	32.6	.5174	121.6	10.32	52.0	11.00	13.37	4.57
Karakule-Rambouillet.....	89.3	107.6	122.6	33.3	.5285	111.6	8.97	50.0	10.00	11.16	3.04

WEIGHTS AND GAINS OF LAMBS.

The lambs were weighed at birth and numbered, weekly weights being made of each individual lamb until eight weeks of age. The average birth weights of all lambs as presented in Table 3 shows a comparison of the several cross breeds of lambs. The records show that the Hampshire lambs averaged the heaviest at birth, weighing 10.3 pounds, with the Lincoln cross a close second with an average of 9.98 pounds. The straight Rambouillet lambs averaged the lightest at birth, this average being 8.4 pounds. It will be observed from the table that during the first eight weeks after the birth of lambs all seemed to make approximately the same amount of gain, the Lincoln cross being slightly in the lead at this age.

As shown by Table 3, at the time of being placed on feed, October 12, the Lincoln cross averaged 10.9 pounds heavier than the Hampshire cross, which was second in weight. This is a remarkable gain over that made by the other lambs and is worthy of further investigation. By again referring to Table 3, it will be observed that during the period October 12 to January 5, the Hampshire cross made the highest daily gain, the average for the period being .34 pound, with the Shropshire second with a gain of .32 pound, while the Southdown cross made the smallest, or a gain of .28 pound daily. The gain made by the Lincoln cross during the period was next above the Southdown average for the same period.

The lambs were divided into two lots January 5, eighty-four being placed in one lot and thirty-six in another. The thirty-six lambs were selected for exhibition at the National Feeders' and Breeders' Show at Fort Worth in March, 1916, six representative "typey" individuals being selected from each of the lots of cross-bred lambs.

The show lambs were fed separately after January 5, as the plan was to ship the main portion of the flock during the middle part of January, and as these lambs were on full feed at that time it would not have been the best policy to full-feed the show lambs at this time, especially in view of the fact that the Fat Stock Show was still two months away.

As may be seen by referring to Table 3, the eighty-four lambs were weighed separately from the show flock after January 5. During the period January 5 to January 17, the Hampshire cross still continued to make the largest daily gain, with the Karakule cross second and the Lincoln third during the period.

At the feed lots on the afternoon of January 17 prior to shipment to the Fort Worth market the Lincoln cross averaged 6.4 pounds heavier than the Hampshires, the Southdown cross averaging the lightest at this time. The lambs all carried heavy fleeces, which tended to reduce the dressing percentage. The Lincoln cross-bred lambs dressed the highest percentage of meat to offal with the Karakule cross second and the Hampshire cross next to the lowest.

The shrinkage enroute market proved interesting. The Lincoln

cross averaged 12.3 per cent. shrinkage, while the Hampshire cross showed a small shrinkage.

When the lambs were offered on the Fort Worth live stock market January 20, the packers did not discriminate against any of the different pens of the cross-bred lambs. After handling them carefully they declared them all to have an equal amount of finish with one kind just as valuable to the packer as the other. The high price of $9.90 per hundredweight was paid for the entire shipment, there being only one 60-pound Rambouillet cull taken out and sold on the market for 6 cents per pound.

The average sales receipts of the lambs are set forth in the last column of Table 3. In this table it will again be observed that the Lincoln cross stood first, with the Hampshire cross 22 cents behind, the Southdown being at the foot of the list.

Table 4 is similar to Table 3, the only difference being that the latter had to do with the weights, gains, shrinkages, dressing percentages, etc., of the thirty-six lambs held back for the National Feeders' and Breeders' Fat Stock Show in March. By referring to Table 4, it will be observed that the Hampshire cross made the largest gain during the period January 5 to March 8, with the Karakule cross a close second and the Lincoln third, all three crosses showing a gain in excess of one-half pound per head daily.

The lambs were weighed at the feed lots March 8, and the Lincoln cross weighed 1.3 pounds more than the Hampshire cross. It is interesting to note, however, that after being shipped to Fort Worth and placed on exhibition at the Fat Stock Show for a week the Hampshires showed a smaller shrinkage than the Lincolns, the Hampshire show lambs averaging five pounds more to the packers than the Lincolns.

By observing closely the tabulation in Table 4, under shrinkage, it will be noted that the shrinkage of the Shropshire, Hampshire, and Southdown crosses is very low. In spite of the fact that the figures in this table show such a low shrinkage, the dressing percentages of these low shrinkage lambs are correspondingly low which only goes to show that there must have been an error committed somewhere in the weighing of the lambs to the packers. The Lincoln cross dressed 52 per cent., and the judge who made the awards well knew that so far as finish is concerned there was but very little difference between the fleshing qualities of the Lincoln, Hampshire, and Southdown lots.

LINCOLN-RAMBOUILLET CROSS FIRST IN PEN OF FAT LAMBS CONTEST.

The six pens of Experiment Station lambs were entered in the pen of five fat lambs contest, and in what was the best lamb contest ever pulled off at the National Feeders' and Breeders' Show. The respective pens of fat lambs exhibited by the Texas Experiment Station were placed in the following order:

First—Lincoln-Rambouillet cross.
Second—Hampshire-Rambouillet cross.

Third—Southdown-Rambouillet cross.
Fourth—Straight Rambouillet.
Fifth—Karakule-Rambouillet cross.
Sixth—Shropshire-Rambouillet cross.

The pen of Lincolns formed a most attractive exhibit and this pen was the first choice of all experienced sheepmen. The Hampshires and Southdowns were attractive and well finished, but they did not have as much valuable wool as was displayed by the pen awarded the first premium.

FINANCIAL STATEMENT.

Table 4 is an itemized statement showing the profit per lamb at the termination of the experiment:

	†83 lambs. Lbs.	36 show lambs. Lbs.
Number of lambs, 120.		
Average weight of lambs beginning of feeding test	60.8	60.8
Average weight at end of feeding period	81.3	113.85
Value of lambs October 12, at $6 75	$ 4.10	$ 4.10
Cost of feed consumed	1.16	2.76
*Cost of freight per lamb	.30	.30
*Cost of feed per lamb on market	.02	.02
*Cost of yardage per lamb on market	.05	.05
Selling commission (single deck, $8.00)	.06	.06
Total cost per lamb	$ 5.69	$ 7.29
Average selling price per lamb	8.05	11.83
Profit per lamb	$ 2.36	$ 4.54
Price per hundred pounds at which lambs actually sold	$ 9.90	$ 10.37
Price necessary to break even	7.00	6.40

*Figured on the basis of a deck load.
†One lamb was dressed at the Experiment Station.

This table shows the profits per lamb based upon single deck loads. In this particular test the total cost of shipping, yardage, feed, and sales commission amounted to 63 cents per lamb for the eighty-three head marketed in January, and $1.60 per head for the thirty-six exhibited at the National Feeders' and Breeders' Show in March. It is interesting to note that the net profits per head are $2.36 and $4.54, respectively, based upon carload lots. Too much significance should not be given the comparison of the two lots as shown in this table because the advantage is with the show lambs throughout, they having been selected from the main flock early in January. It is interesting, however, to observe that the show lambs were placed on a more expensive ration, the average cost of feed consumed by them totaling $2.76, or an increased cost per head of $1.60 over that consumed by the main flock marketed in January. The show lambs made splendid gains from January 18 to March 8, and as shown by the last item in Table 4, could have been sold as low as $6.40 per hundred, while it would have been necessary to secure at least $7.00 per hundred to have broken even at the time of the disposal of the lambs in January.

FINANCIAL STATEMENT ON SHEEP BREEDING AND FEEDING PROJECT CONDUCTED AT TEXAS SUBSTATION NO. 7, LOCATED AT SPUR, TEXAS.

September, 1914—June, 1916.

Expenditures.

148 ewes at $5.00 per head	$ 740.00
5 rams	125.00
Freight and express on ewes and rams	63.69
Total feed for lambs	250.13
Total feed for breeding flock	64.67
	$1,243.49

Receipts.

Sale 120 lambs (net), January and March, 1916	$ 982.56
1915—Sale 840 pounds wool at 22¾c, net	179.84
1916—Sale 696 pounds wool at 27c, less 2½ per cent. warehouse charge	183.23
Sale 50 ewes at $6.00 per head	300.00
Sale 2 rams	40.00
Premiums Fat Stock Show (Fort Worth), 1916	47.00
	$1,732.63
Less principal	1,243.49
	$ 489.14
Inventory*—90 head of ewes at $5.00 per head	450.00
Profit	$ 939.14

Per cent. profit on investment, 75.5.

The financial statement presented in this bulletin is to impress upon the minds of the readers that when such an investment on the farm returns as high as from 50 to 100 per cent. annually it must be worthy of some consideration.

The statement shows the total outlay of capital required to finance this sheep work, exclusive of labor, was $1243.49. Interest has not been charged against the expenditures presented in the preceding financial statement. Under receipts it will be observed that the lambs returned a handsome profit. The wool from the Rambouillet ewes during two successive seasons brought high prices and the inventory carries the ninety remaining ewes at the same price paid for them two years ago. This has been made possible only as a result of the upward trend of the sheep market generally during the past two seasons.

In the foregoing financial statement the prices of feeds charged

*Although the ewes have an 80 per cent. lamb crop that will be marketable during the winter, their value has not been estimated in the above statement.

against the account are high. Under the ordinary farm conditions it will not be necessary to feed as much grain as was consumed during the test herein reported. With small flocks numbering twenty-five to seventy-five head, there will be enough waste on the farm to carry them through the winter months in good shape. Some of the progressive farmers of North Texas allow the flocks to graze the winter wheat fields during the winter months. Care is taken not to over-graze, and in the spring the flocks are removed to the native pasture grasses, where they remain until the wheat and other farm crops have been harvested; then they are given access to these harvested fields, upon which they convert into flesh and fat, products that ordinarily go to waste on the great majority of Texas farms. The preceding statement shows that a profit of 75.5 per cent. was realized on the original investment. In other words, the sheep in the test herein reported returned the Texas Experiment Station $489.14 in cash, and today there are ninety ewes on hand and 80 per cent. of them now have lambs at their side ready to go on feed this fall.

ACKNOWLEDGMENT.

The author is indebted to Mr. R. E. Dickson, Superintendent Substation No. 7, and to Mr. H. E. Evans, the sheep attendant, whose combined efforts aided materially in carrying the experiment herein reported to a successful termination.

SUMMARY.

1. Each of the several lots of cross-bred lambs studied during the experiment herein reported were thrifty and hardy from birth.

2. The highest average birth weight was attained by the Hampshire-Rambouillet cross.

3. The Lincoln-Rambouillet cross made the greatest total gain.

4. The Lincoln-Rambouillet cross seemed to finish in a shorter period than did the other crosses, although in this respect all the lambs put on a good finish.

5. On the market January 20, 1916, the packer buyers graded the entire offering, with the exception of one Rambouillet, as "choice." With the one exception above enumerated, the six lots sold at $9.90 per hundred pounds live weight, this figure being the highest ever paid on the Fort Worth market at that season of the year for fat lambs.

6. On this test the lambs made the cheapest gains during the early portion of the feeding period where they secured a great deal of their bulky feed in the fields.

7. With the choice of five of the best lambs from each of the respective crosses in competition for honors in the fat lamb class at the National Feeders' and Breeders' Show in March, 1916, the several pens in competition were placed in the following order:

Lincoln-Rambouillet cross, first.

Hampshire-Rambouillet cross, second.

Southdown-Rambouillet cross, third.

Rambouillet, fourth.

Karakule-Rambouillet cross, fifth.

Shropshire-Rambouillet cross, sixth.

8. Summarizing the entire feeding test from October to March, the lambs consumed 8.06 pounds of dry feed for each pound increase in live weight.

9. During the several periods of the feeding test, the average cost of feed per hundred pounds of gain was:

October 13 to January 5	$3.32
January 6 to January 17	5.03
Show lambs January 6 to March 8	6.32